

DETAILED ACTION

The preliminary amendments filed by applicant on June 2, 2006 and October 20, 2006 have been acknowledged. The preliminary amendments include a new Abstract, amendment made to the Specification to include the continuing data, and amendment to claims 3, 5-10 and 12-14.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims **1-14** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is indefinite because it does not positively recite any method steps. Claim 1 recites actions being performed, however, it is unclear whether said actions are intended to be limiting. For example, claim 2 recites the steps of forming a solution comprising a precursor, and heating the aerosol of the precursor solution to form the nanoparticles. Because these steps are recited in claim 2 rather than claim 1, it is unclear what method steps claim 1 comprises.

Regarding claims 4, 6 and 8, the phrase "such as" renders the claims indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Regarding claims 7 and 13, the phrase "in particular" renders the claims indefinite because it is unclear whether the scopes of the claims are limited to the

limitations following the phrase. A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c).

For examination purposes, the phrases that are deemed indefinite (i.e. "in particular" and "such as") will be considered non-limiting.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims **1 and 3-15** are rejected under 35 U.S.C. 102(b) as being anticipated by Laine et al. (US 5,958,361).

Laine et al. disclose a method of synthesizing metal oxide crystalline nanoparticles by means of spray pyrolysis (see Abstract). The method comprises the steps of forming a solution comprising a metal oxide precursor (e.g. glycolato polymetallooxane) dissolved in a polar solvent (e.g. ethanol) (see lines 4-10, col. 11), aerosolizing the solution, conveying the aerosol to a furnace using nitrogen gas (see lines 30-35, col. 16), and converting the aerosol to crystalline nanoparticles having sizes ranging between 10-100 nm (see line 36, col. 17). The metal of the metal oxide can be Group III metals such as gallium and indium; Group IV metals such as tin and germanium; or transition metals such as hafnium, vanadium, cobalt, tungsten and chromium (see

lines 11-25, col. 9). The precursor has one of many formulas (see columns 6-10). The precursor can incorporate a metal cation (see lines 35-40, col. 8).

With respect to claims 14 and 15, because the nanoparticles disclosed by Laine et al. are crystalline particles, it appears that the nanoparticles comprise parallelepipeds and rectangles.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Laine et al. in view of Doty et al. (US 4,689,247).

Laine et al. do not disclose the use of a nebulizer to form the aerosol.

Doty et al. disclose a method for conducting spray pyrolysis wherein the aerosol that is fed to the furnace is formed using an ultrasonic nebulizer (see lines 1-10, col. 9). Given that it is well-known in the art to form aerosol using an ultrasonic nebulizer for purposes of conducting spray pyrolysis, it would have been obvious to one of ordinary skill in the art to use an ultrasonic nebulizer to form the aerosol disclosed by Laine et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PAUL S. HYUN whose telephone number is (571)272-8559. The examiner can normally be reached on Monday-Friday 8AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571)-272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Paul S Hyun/
Examiner, Art Unit 1797

/Jill Warden/
Supervisory Patent Examiner, Art Unit 1797